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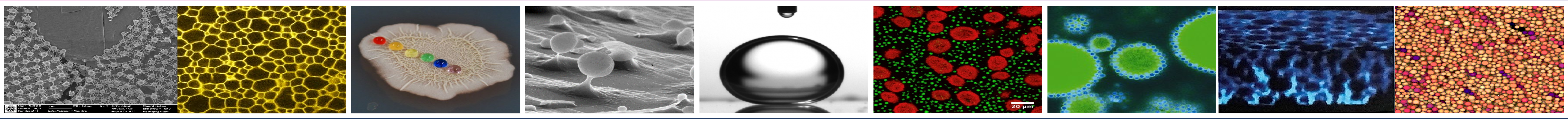
Biodiversity and Cosmetics: Reaching Sustainable Technology



Liquid crystalline-based system and surface-active proteins as novel ingredients for high performance formulations

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DAINTech

DAINTech is a technology which utilises a nematic liquid crystalline gel phase to arrest a dispersion of particles

- The nematic liquid crystalline phase is achieved by using cellulose nanocrystals from wood or algal sources

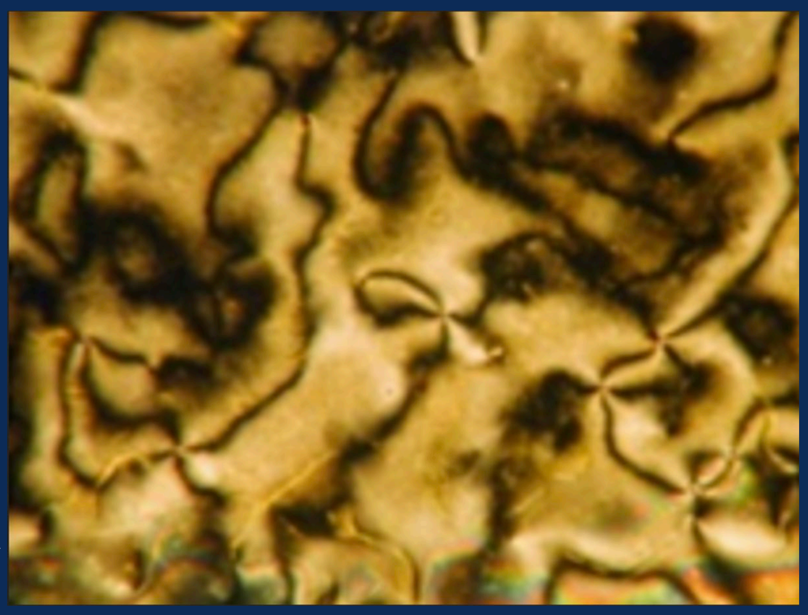
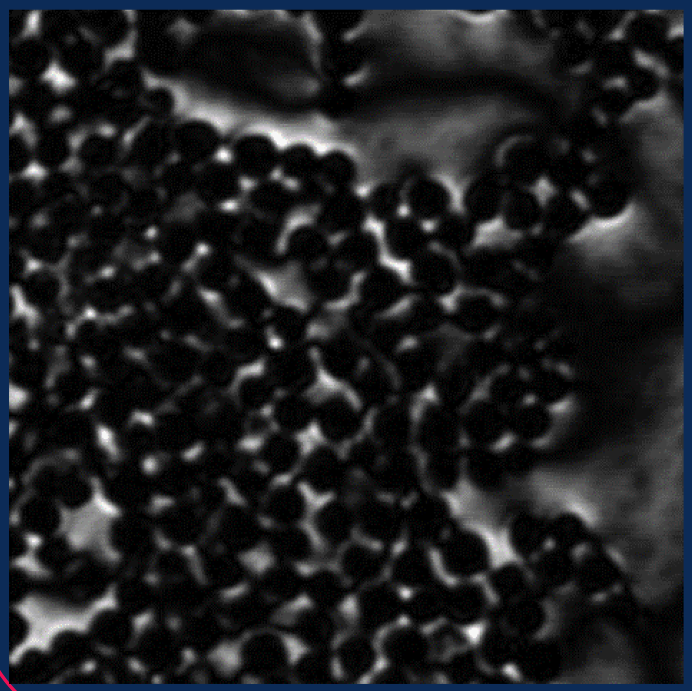


Fig 1. An optical microscopy image of a nematic liquid crystal with viewed through cross polarisers, dark regions are parallel to the polariser



- Gel phase can carry a dispersed phase of 20% to 45% by volume
- It has shown superior properties compared to conventional polymer-thickened formulations

Fig 2. Micrograph between crossed polarisers revealing defect lines around colloids. The colloids have a diameter of 2 μm

Biofilm surface layer A (BslA)

- BslA (Biofilm surface layer A) is an important protein found in Bacillus subtillis biofilms
- BslA assembles at interfaces, providing performance and stability benefits over other protein-based surfactants
- BslA is capable of emulsifying multicomponent systems and stabilising emulsions with defined microstructures by forming a robust interfacial elastic film

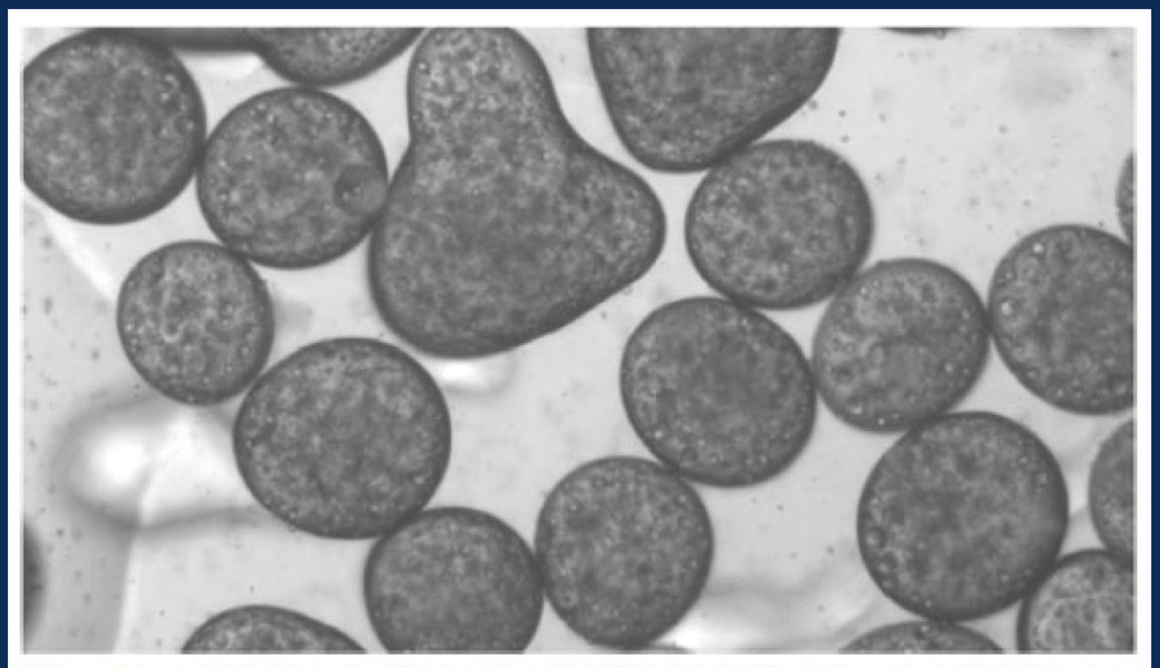


Fig 3. Electron micrograph of a water-in-glycerol trioctanoate-in-water multiple emulsion formed in one step and stabilised at both interfaces by BslA

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Applications

DAINTech: Rheological Comparison to Commercial Toothpaste

- The DAINTech model toothpaste formulation was prepared with abrasive silica, thickening silica and sodium fluoride, at the same concentration as the commercial toothpaste
- As G'>G'', at lower frequencies, the DAINTech sample will remain structured and behave more solid-like over longer times, keeping the active ingredients dispersed and preventing creaming or sedimentation. Thus, providing better stability compared to the commercial toothpaste

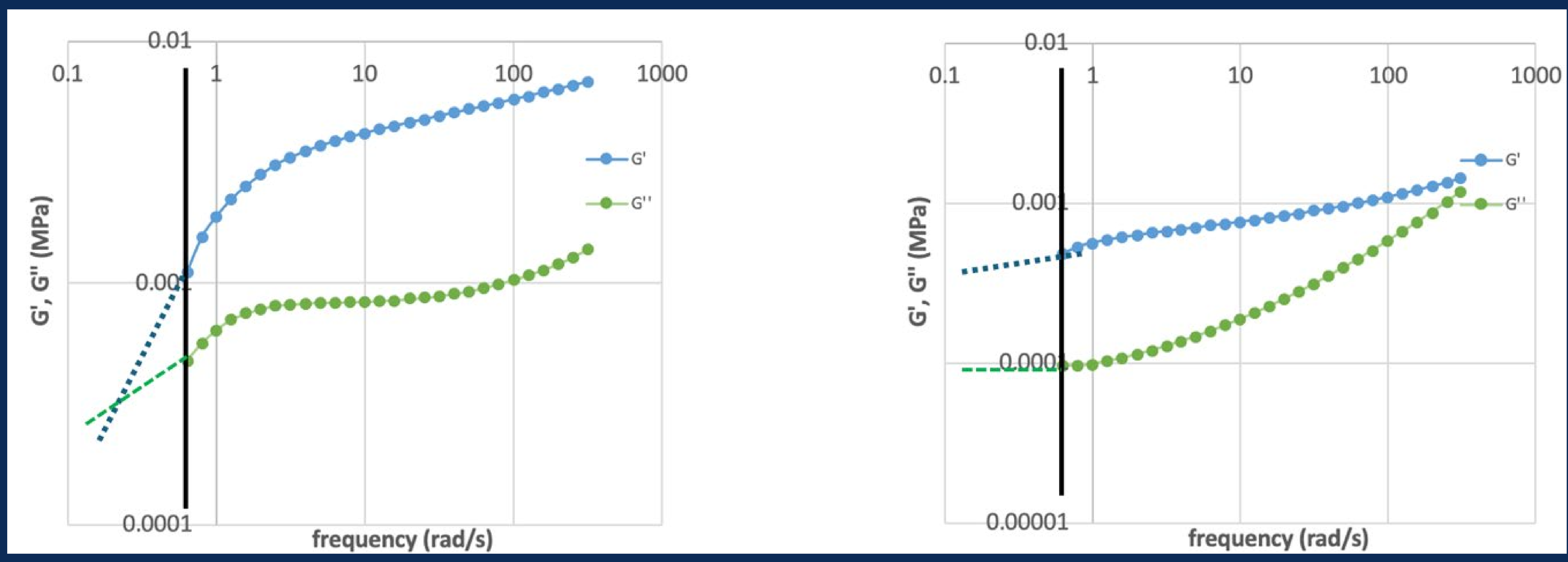

Fig 4. Two plots showing G' and G'' as a function of frequency for the commercial toothpaste (left) and the model system using DAINTech (right).

BslA: A Novel Ingredient for Haircare Products

Human hair samples were treated with a solution of BslA to determine whether permanent binding occurred

- Prior to treating the hair samples, Alexfluor 594 was attached to the BsLA allowing fluorescence microscopy to be used confirm binding
- Once treated the hair was washed using a mild surfactant solution
- Microscopy confirmed that BsLA was still bound to the hair after several washes, revealing the potential to use as a carrier for actives in haircare products such as hair dye

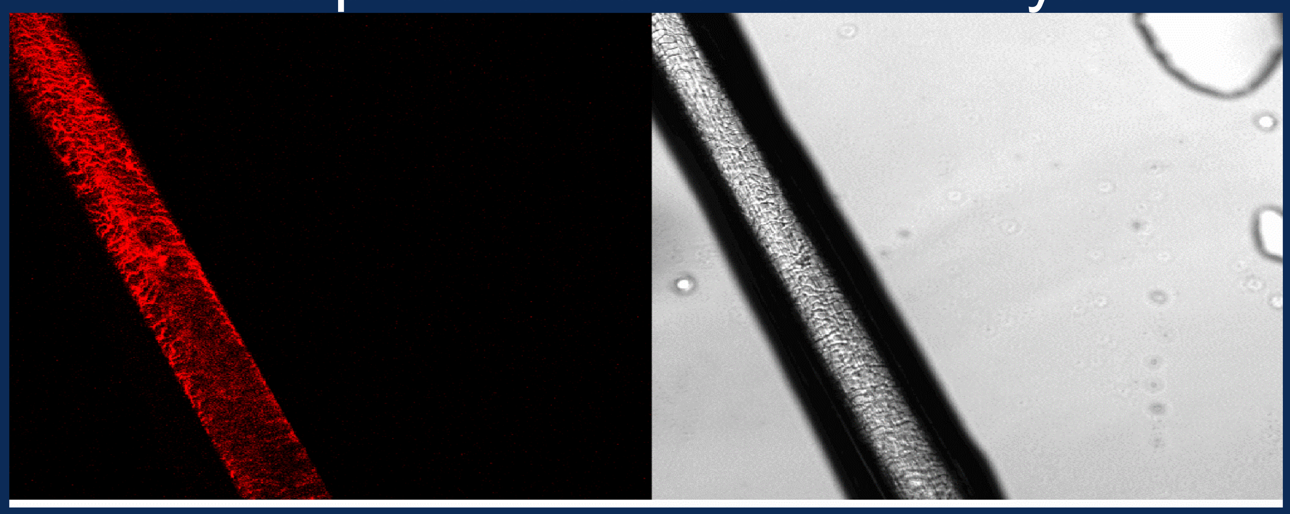

Fig 5. Image on left is the fluorescence signal from a strand of hair with labelled BslA (Alexfluor 594). Image on right is the corresponding bright field image.

ORGANIZERS

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